ORTHOPEDIC DEFORMITIES

OF

EARLY CHILDHOOD.

BY

CHARLES F. STILLMAN, M.D.,

NEW YORK.

Reprinted from THE AMERICAN JOURNAL OF OBSTETRICS AND DISEASES OF WOMEN AND CHILDREN, *Vol. XV., No. IV., October*, 1882.

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PAPER NO. II.

Inversion of the Feet.

THIS condition may be either local or general. Local inversion is limited to the foot, and is not dependent upon malpositions of the knee or hip joints. It is associated with and caused by a weakened condition of the external supports of the ankle; the patient pointing the toes inward and turning the foot under thus walking upon the outside of the sole (Fig. 1).

In walking, the gait is often a shuffle, due to the fact that the anterior portion of the foot is not well lifted from the ground, the muscular power being deficient.

The treatment consists in augmenting the power of the muscles by electricity, rubbing, etc., and providing a proper apparatus to keep the foot in its normal relations with the leg without restricting the natural motions of the ankle, which are flexion, extension, and lateral movement.

It is conceded by all authorities that flexion and extension

of the foot are both performed by the ankle-joint; but the movements of inversion and eversion are variously assigned to the astragalo-calcaneoid and mediotarsal articulations, it being asserted with positiveness that the ankle-joint, being a true hinge-oint, is thereby rendered incapable of any lateral movement, whatever. And yet that it does, to a limited extent, take place in this joint is apparent if the supports of the joint are allowed to relax, and the weight of the body is removed.

Let the reader cross one leg over the opposite thigh so that

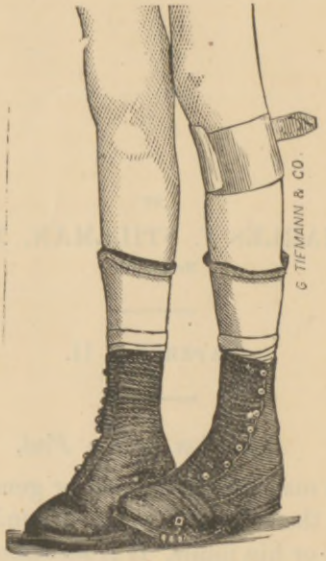

FIG. 1.

the foot becomes perfectly relaxed. Now, define the sides of the astragalus and os calcis under the malleoli with finger and thumb of one hand, and with the other grasp the foot, and roll it under freely. The astragalus will be felt to move just under the internal malleolus, and by the exercise of a little force the foot, as a whole, can be turned under almost to a right angle with the leg, the astragalus seeming to project almost to a level with the internal malleolus; while a depression can be fell under the external malleolus. This rolling of the foot upon its horizontal axis, with inversion, seems to take place partly in

the ankle, partly in the astragalo-calcaneoid articulation, and secondarily in the articulation of the head of the fibula with the tibia.

Lateral movement cannot take place in the ankle, however, unless the joint be relaxed externally; but when this is done, the hinge character of the joint is destroyed, and it is converted into a *movable* joint by the release of the outer surfaces of the articulation from contact with each other, thus allowing an extent of motion which is entirely impossible if the pressure be so sustained that the joint cannot be relaxed in its outer portion.

When, from undue muscular power, a misstep or other accident, the ankle becomes suddenly turned under while supporting the weight of the body, the surfaces of the outer part of the articulation become suddenly separated; while those of the inner part are jammed abnormally together. The joint is then rendered temporarily incapable of sustaining such weight, and grave injuries to the articulation are apt to result; the most frequent being common sprained ankle, and one of the lesions of which is the wrench sustained by the peronei muscles, one of whose functions seems to be to brace the foot at such an angle as to allow it to receive the weight of the body in a comfortable or advantageous position; this weight and the muscular power together locking it firmly in position until it is again relaxed or unlocked by being lifted from the ground, the weight of the foot then acting to relax the joint.

The prevailing opinion, that lateral motion in the ankle-joint is impossible, is partially correct since it does not take place in the *locked* condition of the joint, but in the *unlocked* condition, when the foot is rolled under, it would seem that lateral movement is not only possible, but that it actually takes place in the joint to a limited extent every time a step is taken, and the foot lifted and set down in position to receive the weight of the body to the best advantage.

All braces which are applied at the ankle should, therefore, be either pivoted at the side or beneath the foot, or be of sufficiently flexible material to allow a normal amount of lateral motion; otherwise they embarrass the proper movement of the foot.

The plan of treatment to be pursued in most cases of local inversion, after the physician is satisfied by thorough examination of the entire limb that the deformity is purely local, is to afford support, and at the same time, by spring power, to endeavor to bring the foot around to its normal position without restricting motion. This is accomplished in either of two ways: In the first, a jointed outside steel strip is used, attached to the bottom of the shoe by a pivot in the "centre of motion" of the

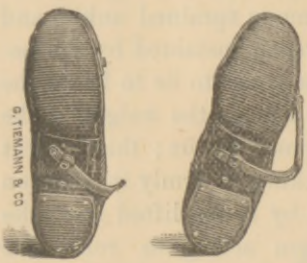

FIG. 2.

FIG. 3.

foot, thus allowing lateral motion (Fig. 2), and attached to the leg just below the knee by a girth (Fig. 3), which *must* be prevented from slipping by a strip of moleskin adhesive plaster buttoned over the girth, or drawn through the buckle, and thus fastened securely. A rubber cord or coiled spring of varying strength is now added, which passes from the strip to the outside of the shoe near the toe (Fig. 3). This cord should not be connected at both ends until the girth is firmly fastened to the limb, as otherwise the girth will rotate.

To prevent the foot turning under at the ankle, the steel strip is given an outward inclination where it passes under the shoe, which converts it into a spring when the brace is buckled t

the limb, effectually preventing the joint from giving way externally.

A simpler method of treating inversion, and one which possesses many advantages for general use, is the *twisted spring* (Fig. 4). It consists of a flat steel strip, jointed at the ankle, placed outside the leg only, and extends from a girth below the knee to the bottom of the shoe, where it is attached adjustably. This would merely afford support, were it not bent outward at the point where it passes under the shoe, thus effectually supporting the ankle. In addition, however, that part of the strip extending from the ankle to the girth is *twisted* out-

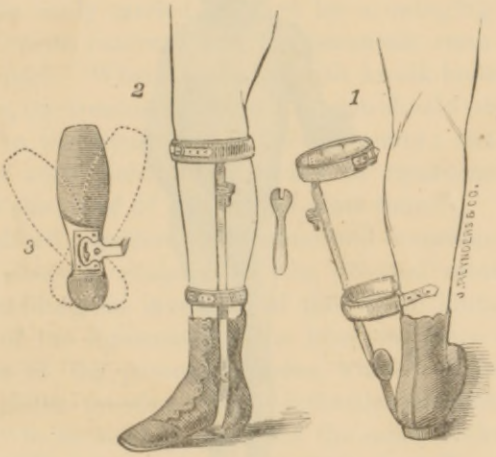

FIG. 4.

ward, thus producing an everting spring, which throws the foot outward when the girth is fastened around the leg. This everting power will be constant, and its form may be regulated by a clamp opposite the tibio-fibular articulation.

This brace also affords the support which is necessary in many of these cases, especially when due to paralysis, and as it rarely needs adhesive plaster, is extremely light and easy of application and removal. For children it is especially advantageous. While the brace is worn, the muscles should be vigorously stimulated by the means at our command, in order to hasten cure; but the use of a proper brace to assist the development of the muscles is the most important element of the

treatment. I do not limit myself, or should I recommend the reader to limit himself, to these braces alone; but as they are applicable to perhaps a larger number of cases than some others, they are detailed at length. Yet it will be found that certain special cases, which space forbids us to dwell upon here, will need the employment of special mechanisms.

General inversion of a limb (see Fig. 5), or, as it is more commonly called, rotation, is very often met with, either alone, or

FIG. 5.

combined with bowlegs, knock-knee, muscular insufficiency, and various deformities and conditions of joints.

Dr. De Forest Willard, who has bestowed much attention upon this subject, states that "this condition and its opposite, eversion, so rarely occur without some co-existent deformity, that a careful search should be instituted to detect the probable cause for such misplacement. If there be disease at the pelvis or hip, the inversion is ordinarily due to a rotation at the hip-joint; if knock-knee exists, the rotation will be partially at the knee, partially at the ankle; and the same is true in bowlegs.

If there is impairment of power in the thigh or leg muscles, then the inversion or eversion will be in accordance with such deficiency.

The inversion, in case of knock-knee, is probably due to the fact that, the knees being brought close together, the feet are widely separated; consequently, in walking, this too wide base of support is sought to be narrowed by bringing the toes nearer together.

Let any one attempt to walk with his knees and feet in the position of knock-knee, and he will fully appreciate the truth of this statement. With the toes turned outward, progression is exceedingly difficult, but with the toes turned inward, the feet can be easily carried forward by a swinging motion, in which the vastus externus and the peroneals seem to play an important part. When associated with knock-knee and allied deformities, the treatment of the inversion should be considered secondary to the treatment of the deformity; but it will be found that each yield more readily to treatment which is directed to the relief of both at the same time."

Dr. Bradford considers that "abnormal inversion of the foot is due to either a weakness of the external rotators of the thigh, permitting an inversion of the whole limb, a relaxed condition of the ligaments of the knee, or, more commonly, a weakness of the peronei muscles, which are overpowered by the tibiales muscles." In infantile paralysis, he considers this "to be most marked, but the same tendency will be seen to a slighter degree in non-paralytic cases."

There is one point upon which too little thought is usually given in the treatment of such deformities as we are now considering, and that is the thorough examination of the genital organs. Inquire of the parents or nurse whether the child has the habit of rubbing or playing with its genitals, and this you will find to be very often the case. If, on examination, you discover any abnormal cause for such genital irritation, as phimosis, adherent prepuce, or clitoris, this should be relieved before mechanical treatment is attempted, as, in some cases, it will obviate the necessity for such treatment.

Too much credit cannot be given by the profession to Prof. L. A. Sayre for the prominence which he has given to this subject of genital irritation as an element in the causation and

continuance of these abnormal conditions of the lower limbs, and the pertinacity with which he sustains his position.

There exists much difference of opinion in the profession at the present time in regard to the actual value of the operations upon the genitals in these deformities; but when a man of large experience in this domain of surgery is confirmed in his opinion in regard to their usefulness, it is of itself sufficient to insure the subject a fair trial as time elapses; and some of the cases noticed have so thoroughly borne out his statements that I cannot withhold my indorsement as to the value he places upon the subject.

Some of the successful results in cases I have seen are marked, and some cases of failure which have come under my observation seem to have been due to errors of judgment as to the degree of importance which the irritation bore to the extent of the deformity. In some cases, instead of being the cause of the deformity, it is merely a co-existing trouble without direct relation to it; and, of course, in such the operative procedures for the relief of the irritation possess no curative power over the deformity whatever. It appeals to the common sense that when an abnormal irritation of these parts exists, measures should be immediately taken for its removal; for, while the operations can do no possible harm, they are productive of cleanliness and other good results to the patients, and in many cases are of permanent benefit to the co-existent deformity. As to the exact benefit to be derived in each individual case, that can only be determined by actual procedure, although an approximate opinion may be given from the history and general conditions of the case.

I have in mind, among others, a case of double inversion, caused by infantile paralysis occurring in a female child, which had steadily resisted all treatment until, in consultation with Dr. Geo. F. Shrady, we decided to examine the clitoris, after eliciting the fact that the patient was continually rubbing herself; and we found it hypertrophied, engorged, and bound down by adhesions to the surrounding parts, the forcible rupture of which, under an anesthetic, was followed by prompt improvement, and conjoined with mechanical means, by the recovery of the patient.

The following extract from a letter from Dr. Geo. K. Smith,

of Brooklyn, will be found of practical value in this connection, and it is therefore inserted here:

Wm. McC——, age four years, colored (see Fig. 6), came under my care in the summer of 1879.

The photograph shows the feet inverted to such an extent that he walked on the outer border, and, to a slight degree, on the dorsum of each foot. The legs bowed outward. On examination, I found the opening in the foreskin so small that it could not be drawn back over the glans, and the prepuce was adherent. Behind the glans was a quantity of smegma, which could be felt by slight pressure with the thumb and finger. I ventured the opinion that the malformation of the limbs and the malposition of the feet were caused by irritation at the extremity of the penis. I further stated to the father that I believed that if the operation

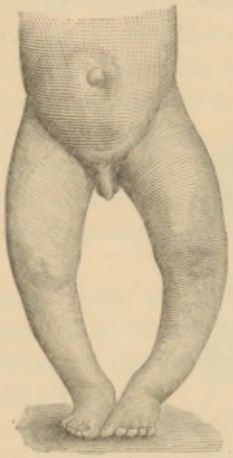

FIG. 6.

of circumcision were performed, the limbs, which were now bending beneath their burden, would become stronger, and that nature would straighten them without the aid of the costly apparatus used by surgeons to accomplish the same result.

I performed the operation, and in a few months it was plainly perceptible that the limbs were becoming straighter, and at the end of a year the improvement in this direction was but little less than marvellous. About this time, the boy and his mother were sent to live with friends out of the city, and I did not see him again. Eight months ago, the father told me one limb was entirely natural, and the other nearly straight.

After the presence or absence of genital irritation is determined, and, if present, relieved, the question of mechanical treatment of the inversion arises.

There are three classes of braces which may be used in the treatment of general inversion of a limb: rigid force, adjustable force, and spring force. Rigid force is produced by a metal bar attached to the shoe, and extending along the limb to a pelvic band, with appropriate girths and joints between, and, in some cases, accomplishes good results. An instrument of this class is described by Dr. Bradford, of Boston, as a pair of steel rods jointed at the knee and ankle, fastened into the

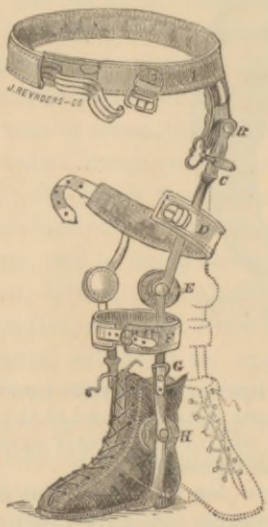

FIG. 7.

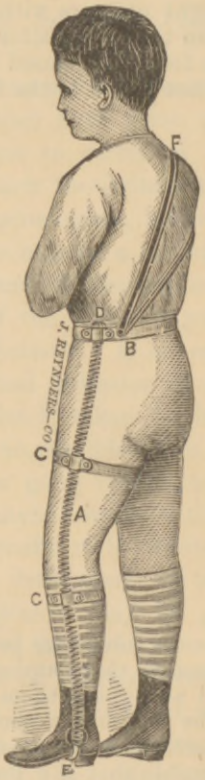

FIG. 8.

sole of the shoe, and passing on the outer side of the legs, reaching as high as the hips. At the hips, the rods are bent at the top, so as to pass behind the buttock, and incorporated in a strap which girdles the hip. If the top portions are properly bent, he considers it impossible, when the pieces on the two sides are fastened together behind, for either

foot to turn in, as it is held out by the outward rotation of the opposite limb. I have never tried this instrument, but should think it would make an excellent hip rotator, especially if the ends of the two rods be fastened together behind the buttock with a piece of elastic or spring.

Adjustable force is produced by the addition of a ratchet or ratchets to the foregoing, so that the vertical axes of the attachment girths may be placed in different planes at the will of the surgeon, thus effecting rotation when the attachments are fastened about the limb. As a representative of this class may be mentioned Sayre's rotating screw, depicted in Fig. 7; and in instances where it has been desired to rotate the limb at the hip, I have used this with satisfactory results. This instrument might be much improved by the addition of a ratchet just below the knee, and also below the foot, thus providing for rotation of the foot and leg, as well as the rotation of the entire limb at the hip, which it now accomplishes.

Spring force is the most generally advantageous power used in the treatment of inversion, because of its lightness and effectiveness, and the spiral spring seems to be the most efficient form.

So far as I am aware, there are but two forms of spiral spring to effect a rotation of an inverted limb.

First, the *coiled spiral* of Dr. Gregory Doyle, and second, the *twisted* spiral of the writer.

The action of both is that of constant coaxing, the muscles being assisted without being supplanted, or, more correctly, the bony framework of the limb is kept in proper position, so that the muscles may act normally. They are both light and comfortable, and easily managed. There is one feature of the writer's apparatus which Doyle's does not possess, and that is, support; for the former is an articulated, continuous, steel strip, which strengthens the limb as well as rotates it.

Dr. Doyle's rotator consists in a coiled spiral spring extending along the outside of the leg from a pelvic band, or corset, to the shoe, held in position by girths about the thigh and leg (Fig. 8). If these girths be fixed, the constant tendency of the spring to uncoil itself turns the thigh on the pelvis, the leg on the thigh, and the foot on the leg; and, as the instrument is exceedingly flexible, it is very nicely adapted to young chil-

dren and others when support of the limb is not required. But in so many cases of inversion, the articulations of the limb are so lax that some support is also desired, and for such cases an instrument consisting of a flat steel strip (Fig. 9), extending along the outside of the limb, from the shoe to the hip, articulated at ankle and knee, and provided with suitable girths, may be employed. This strip is twisted outward (thus forming a spiral) between the ankle and calf girths, thus (the foot being turned outward at the pivot beneath the shoe) turning the leg on the thigh. The strip is also twisted outward between the thigh

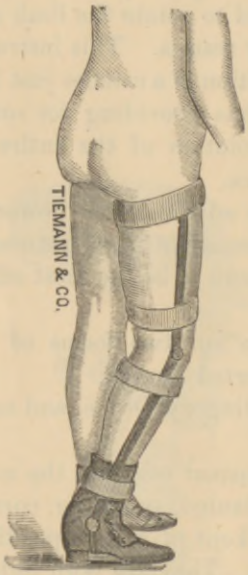

FIG. 9.

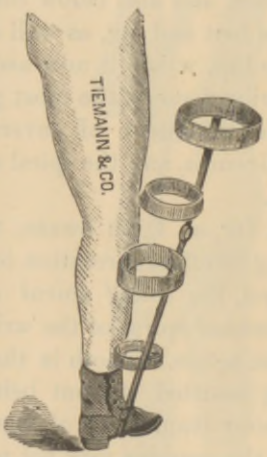

FIG. 10.

girths, thus forming a spiral which rotates the thigh on the pelvis without the necessity of a pelvic band (see Figs. 9 and 10). The amount of rotation can be regulated at will by means of small clamps connected with the two twisted spirals.

There can be no given rule for the employment of any of these instruments, nor would every case be equally well treated by any special one. The well-balanced surgeon who has in mind the principles governing the cure of such deformities, adapts and adopts certain instruments to produce given results in certain cases, and it is a mistake for one to confine himself to any one

plan of treatment. Certain instruments are preferable to others, which, in their turn, possess special advantages in still other cases, and it depends entirely upon the judgment of the practitioner, his knowledge of surgical mechanics, and his skill in adaptation, whether he shall obtain a more prompt cure than his neighbor.

The braces should be removed often (at least twice daily) for the thorough rubbing, kneading, and, if possible, electrical treatment of the deficient muscles.

THE AMERICAN JOURNAL OF OBSTETRICS

AND

DISEASES OF WOMEN AND CHILDREN.

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"THERE has probably been no period in which obstetrics and gynecology have engaged more attention, both at home and abroad, than they do at the present time, and the tremendous strides which the above branches of the science of medicine have made within the last few years have necessarily given us literature of the same which equals, if it does not excel, that of any other branch. It is to be regretted, however, that the practical part of our profession is so arduous, and the fulfilment of its duties consumes so much time, that weeks, and doubtless in many instances even months, elapse before we become familiar with the latest and accepted views and teachings of those who are recognized as authorities in their subject; a few moments, however, given to the perusal of a journal, will often supply the place of original works, by giving extracts, reviews, and a general synopsis of the same, while its original communications, when carefully selected, will likewise afford valuable and practical information. It is well known that there are many in the profession who, though shrinking from the arduous task of writing a book on results of years of practical study, are yet often willing to express their views, or give their valued experience in the pages of a journal." The circumstances which influenced the founding of THE AMERICAN JOURNAL OF OBSTETRICS AND DISEASES OF WOMEN AND CHILDREN, as above set forth by the editor in its initial number, are different now only in degree; for, as time has advanced, the field of its usefulness has extended, until to-day, without a rival, it finds its thousands of appreciative readers in every part of the globe. The history of medical journalism presents no more striking example of success than is indicated by its present popularity and the changes and improvements which have been made in it from the date of its first issue, May, 1868, to the present time. The first number contained 96 pages, or 448 pages in the volume. Beginning January 1st, 1883, THE AMERICAN JOURNAL OF OBSTETRICS will be changed to a *monthly* journal of 112 pages each number, or 1,344 pages in the year, or more than *three times* the number contained in the first volume, and arranged to form two volumes in the year.

As the Journal is pre-eminently the accepted organ for communications in its scope, the original articles which have appeared in its pages include many of the most important contributions to medical literature. Every available means which a liberal outlay of money could employ has been devoted to its copious illustration and its presentation in a form of typographical excellence unequalled by any medical journal in the world. Much of the success of the Journal is due to the very satisfactory management of the departments of Obstetrics and Gynecology by Dr. Paul F. Mundé, and his general supervision of all the literary matter in his capacity as editor-in-chief. The department of Diseases of Children has, under Dr. George B. Fowler's efforts, received the attention which that branch merits, and which as a special department is an important feature of the Journal. The assistance of the distinguished gentlemen whose names are associated with those of the editors as collaborators serves as a further assurance, if such need be, of the increasing usefulness of the Journal, and is the result of an arrangement which was made in view of the extensive foreign circulation it has acquired.